421

# ANNUAL FISH PASSAGE REPORT
# ROCK ISLAND DAM
# COLUMBIA RIVER, WASHINGTON
# 1961

SPECIAL SCIENTIFIC REPORT–FISHERIES No. 421

UNITED STATES DEPARTMENT OF THE INTERIOR
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FISH AND WILDLIFE SERVICE, Clarence F. Pautzke, *Commissioner*
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Paul D. Zimmer and John H. Broughton

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Washington, D. C.
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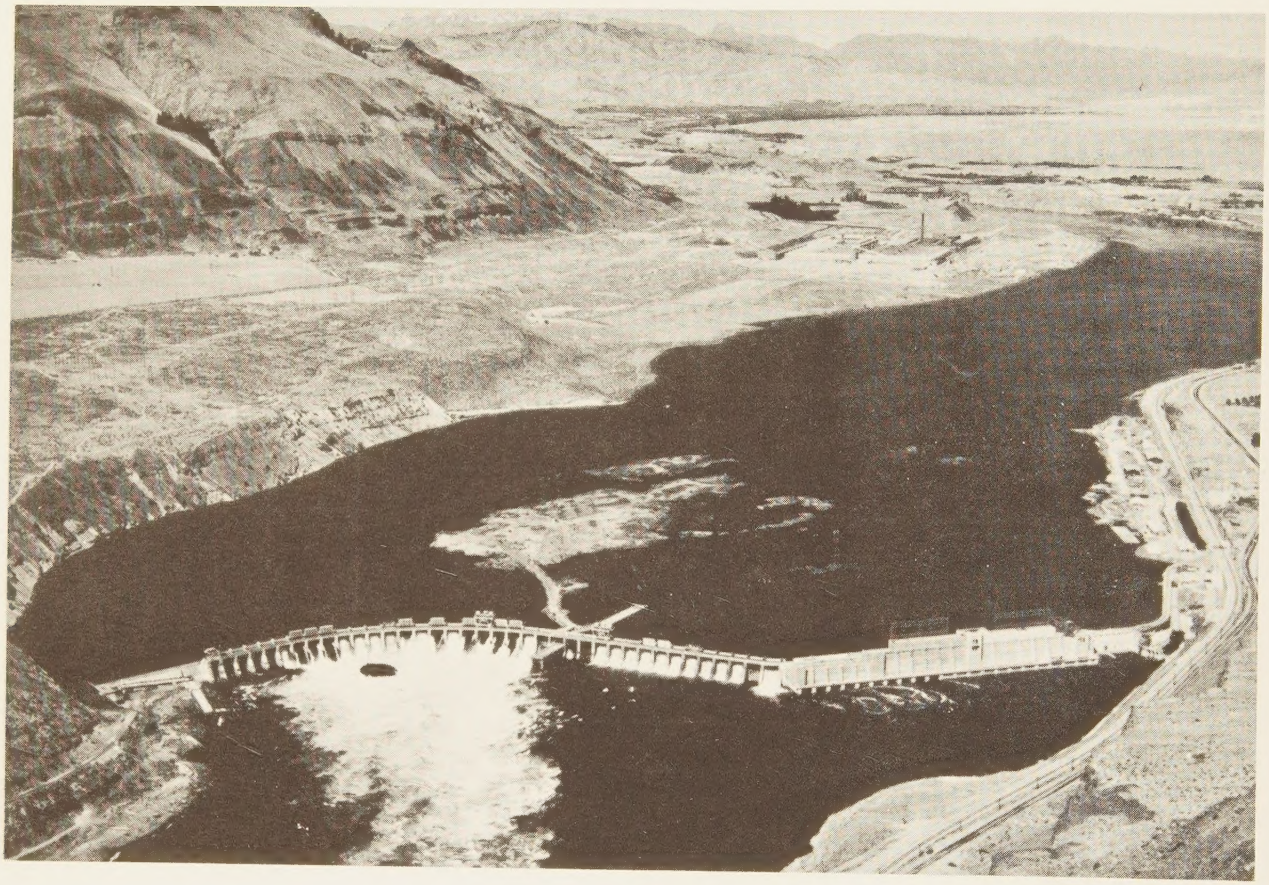

Rock Island Dam, Columbia River, Washington

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# ANNUAL FISH PASSAGE REPORT - ROCK ISLAND DAM COLUMBIA RIVER, WASHINGTON, 1961

by

Paul D. Zimmer, Fishery Biologist (Management)
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## ABSTRACT

Important runs of salmon and steelhead trout pass Rock Island Dam on the Columbia River.

Count of 33,067 chinook salmon in 1961 was well above the mean of 15,560 for the 28-year period 1933-60 and exceeded the 1960 count of 26,532. Sockeye salmon count of 19,233 was slightly more than one-third the 28-year mean of 53,079. Only 50 coho salmon were recorded in 1961. Greatest number of coho salmon, 229, occurred in 1947. The 7,042 steelhead trout passing Rock Island Dam in 1961 was the highest count recorded since counting began in 1933 and was more than twice the 28-year mean of 3,063. 140,173 fish other than salmon and steelhead trout passed through the fishways at Rock Island Dam in 1961.

## INTRODUCTION

Rock Island Dam, located on the Columbia River approximately 12 miles downstream from the city of Wenatchee, Wash., has been in operation since 1933. The plant is owned and operated by Chelan County Public Utility District No. 1.

This report on passage of fish at Rock Island Dam during 1961 provides information on operation of fishways and numbers of fish utilizing upstream fish passage facilities.

Rock Island Dam is now equipped with three fishways: one located on the right bank, another on the left bank, and the third approximately in the center of the dam. Two of the fish ladders were placed in operation in 1933, and the third (middle ladder) was constructed in 1935-36. All three ladders have undergone significant modifications since initial construction.

Included in this report are comments covering various investigations carried on at Rock Island Dam during 1961.

## COUNTING PROCEDURES

Fish counting in 1961 began on May 1 and terminated on October 27. From May 1 to August 19, counting was conducted 16 hours each day, starting at 5 a.m. and ending at 9 p.m. From August 20 to September 30, to

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conform to hours of daylight available, counting was reduced to 14 hours each day, starting at 5 a.m. and ending at 7 p.m. From October 1 to October 9, counting was further reduced to 8 hours each day, starting at 8 a.m. and ending at 4 p.m. From October 10 to October 27, counting was conducted from 8 a.m. to 5 p.m., with 1 hour closure of gates at noon.

A 15-minute rest period was allowed at the end of each hour, and during all periods of noncounting, ladders were closed to passage of fish.

## ENUMERATION OF FISH

### Chinook Salmon, *Oncorhynchus tshawytscha*

The chinook salmon count in 1961 of 33,067 (jacks included) was well above the mean of 15,560 for the 28-year period 1933-61. The count increased over the 1960 run and was a little more than half the peak annual count of 50,713 in 1957 (table 1). Monthly totals of chinook salmon counted are given in table 2. Maximum day's count of chinook salmon, jacks not included, in 1961 was 692 on August 7 (table 3). Tables 4 and 5 show semimonthly totals of number and percentage of chinook salmon count which ascended each fish ladder.

### Chinook Salmon Jacks

Some chinook salmon return from the ocean during the year following their seaward migration and are referred to as "jacks." These fish are predominantly males and are smaller than the average. It has been determined at Rock Island Dam that up to June 30 of each year, jacks rarely, if ever, exceed 18 inches in length, while the balance of the fish appreciably exceed that length. Likewise, from July 1 to the end of the season, jacks rarely, if ever, exceed 22 inches in length. Consequently, jacks at Rock Island Dam are identified by considering all chinook salmon 18 inches or less in length prior to July 1 as jacks, and all chinook salmon 22 inches or less in length subsequent to June 30 as jacks. Maximum day's count of chinook salmon jacks was 199 and occurred on September 18 (table 3). The 9,260 fish recorded as jacks constitute 28.0 percent of the 1961 chinook salmon run.

Table 5 shows number and percent of chinook salmon jack count which ascended each fish ladder. Monthly totals are given in table 2.

### Sockeye Salmon, *Oncorhynchus nerka* (blueback or red)

The sockeye salmon count of 19,233 for 1961 was less than half the 28-year mean of 53,079 (table 1). In 1961 peak of the run was reached on July 14, when 1,289 fish were counted through the fishways at Rock Island Dam.

In recent years attention has been drawn to the many small sockeye salmon appearing at Rock Island Dam. During the 1961 counting period at Rock Island Dam sockeye salmon under 16 inches in length were enumerated as small fish. Number of sockeye salmon recorded as "small" was 3,497 (6.6 percent).

Tables 6 and 7 show semimonthly totals of number and percentage of sockeye salmon count ascending each ladder. Of the sockeye salmon passing Rock Island Dam in 1961, 65.6 percent ascended the left ladder, while 9.9 and 24.5 percent ascended the middle and right ladders, respectively. Data pertaining to sockeye salmon daily counts are contained in tables 9-14. Monthly totals of sockeye salmon counted in 1961 are given in table 2.

### Coho Salmon, *Oncorhynchus kisutch* (silver)

The coho salmon count of 50 fish in 1961 was slightly less than the 28-year mean of 61, and sligthly more than half the 1960 count (table 1). Additional data are shown in tables 11 and 12. Maximum day's count of 8 fish occured on October 4 (table 2).

### Steelhead Trout, *Salmo gairdneri gairdneri*

The steelhead trout count of 7,042 in 1961 was well above the 28-year mean of 3,063 (table 1).

Additional data pertaining to steelhead trout daily counts are contained in tables 7-12.

Maximum day's count in 1961 was 269 on September 19 (table 2).

Table 6 shows semimonthly totals of number and percentage of steelhead trout which ascented each fish ladder.

### Miscellaneous Fish

In 1961, enumeration was made of species of fish other than salmon and steelhead trout passing Rock Island Dam. Data pertaining to these fish are given in tables 15-20. No claims are made as to complete accuracy of identification of these fish. It is felt, however, that the degree of accuracy is consistent with that maintained at other dams on the Columbia River and as such may be used as a rough index of abundance of these fish. In 1961, approximately 140,280 fish other than salmon and steelhead trout passed Rock Island Dam.

## WEATHER AND RIVER DISCHARGE DATA

Headwater and tailwater elevations are plotted on figures 1 and 2, respectively. From 1 p.m. on June 9 through June 13 all fish facilities were nonfunctional due to high water. Air temperatures were taken twice daily by pocket thermometer. Water temperatures were taken at center fish ladder by recording thermometer. Daily records of weather conditions and stream flows are shown on tables 9-14. Daily river discharge data are plotted on figure 3.

## ACTIVITIES AND OBSERVATIONS

A count of 137 chinook salmon on May 1 indicates that initial movement of these fish probably began prior to that date. This is in striking contrast to the late start of fish on May 18, 1959.

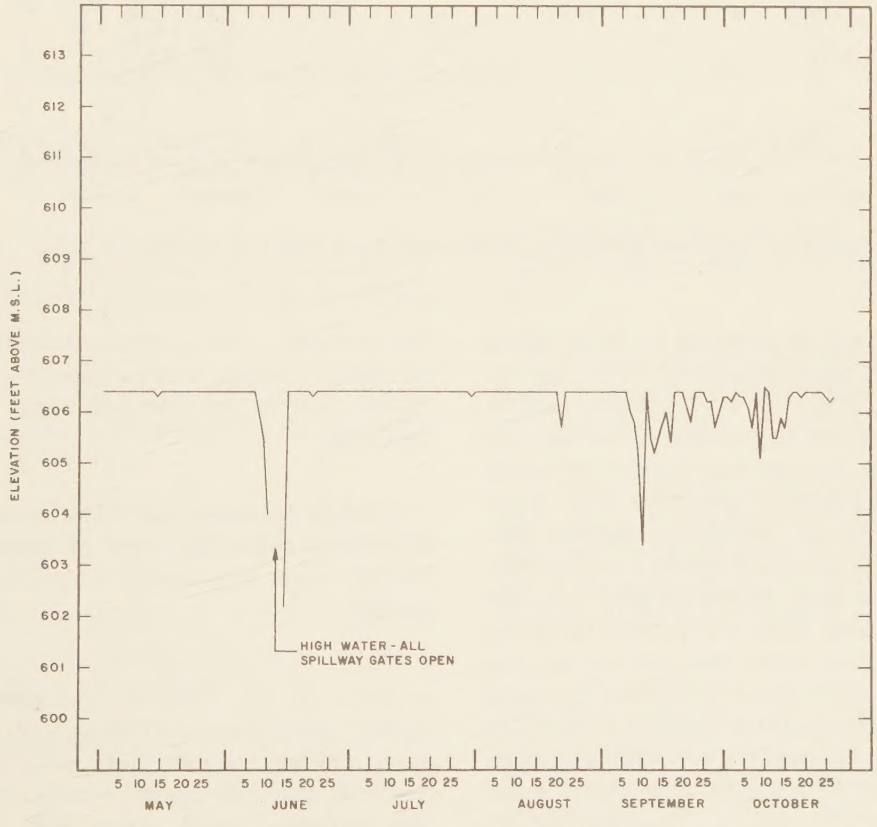


**Figure 1.--Headwater elevations, Rock Island Dam, May 1 to October 27, 1961.**

Figure 2.--Tailwater elevations, Rock Island Dam, May 1 to October 27, 1961.

As in past years of counting at Rock Island Dam, some fish were observed with cuts or abrasions on the body. Of 40,764 fish examined as they passed over the counting boards, approximately 1.06 percent had injuries of some type either on the body or about the head. Since the counters could see only the top and one side of the fish, the incidence of injury was probably greater than indicated. In period May 1 to July 5 all fish were quite free of injuries. Greatest numbers of injuries were observed during July and August and were most numerous on large chinook and sockeye salmon (table 21). In period July 20 to August 12 counters reported a number of fish with similar injuries. The injury most commonly observed was a circular cut or abrasion about 1 inch in diameter, usually along the side of the fish. Some of these injuries were newly made as evidenced by the presence of bloody tissue. Others appeared to have been made much earlier as scar tissue was forming.

During extreme high water period June 10-13 a considerable quantity of gravel, silt, and debris was deposited in the right bank fish ladder.

On July 19 counting facilities at left fish ladder were operated from 9:30 p.m. to 11:45 p.m. Between 9:30 p.m. and 9:45 p.m. two chinook and two sockeye salmon passed over the counting board. From 9:45 p.m. to 11:45 p.m. there was no movement of fish observed.

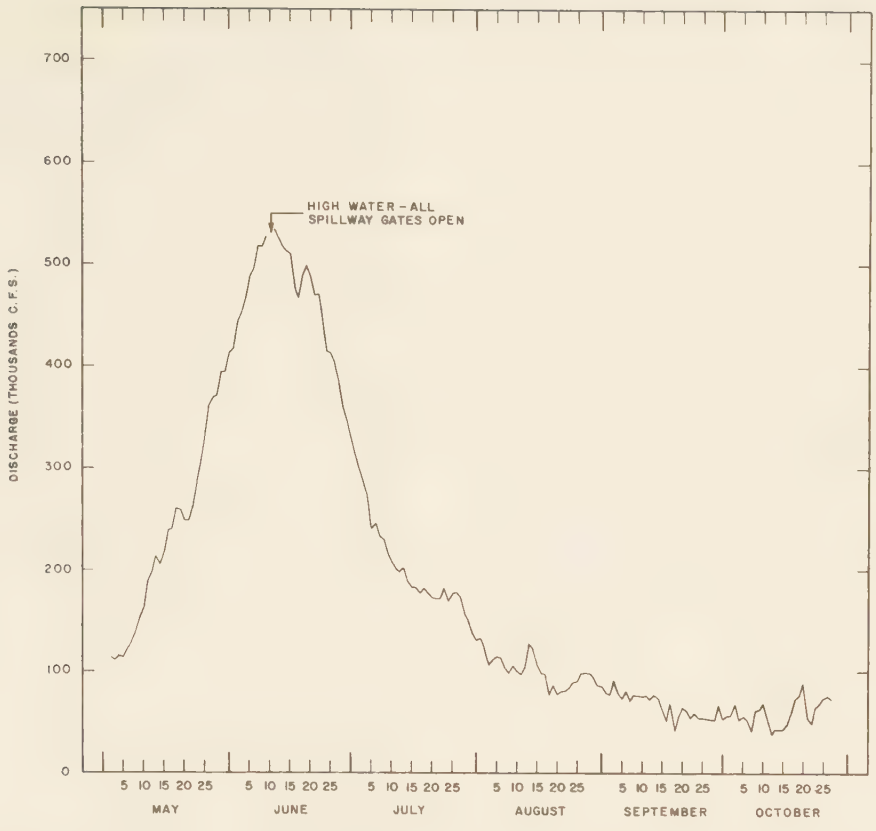


Figure 3.--Daily river discharge, Rock Island Dam, May 1 to October 27, 1961.

The six times that dewatering of fishways at Rock Island Dam occurred in 1961 were as follows:

1. Left fish ladder, from 10 p.m. on May 3 to 1 p.m. on May 5, to install electronic counting equipment.

2. Right fish ladder, from 10 a.m. to 3 p.m. on June 5, to clean ladder orifices and repair telescopic gate chains.

3. Right fish ladder, from 12:45 p.m. to 2:40 p.m. on June 7, to complete ladder repairs.

4. All three fish ladders, from 1 p.m. on June 9 to start of counting on June 14, were inoperative due to high water.

5. Right fish ladder, from 11 a.m. to 3:15 p.m. on June 29, to replace stoplogs lost during high water period.

6. Right fish ladder, from 12:50 p.m. to 2:40 p.m. on July 5, to repair broken gate chain.

## SUMMARY

1. The total Rock Island Dam count of salmon and steelhead in 1961 was 59,392, which was slightly more than half the 1960 count of 93,183.

2. Yearly total counts of salmon and steelhead passing Rock Island Dam during the period 1933-61, inclusive, are given in table 1.

3. The chinook salmon count of 33,067 in 1961 was greater than in 1960 and slightly more than half the peak year of 1957. In 1961, 9,260 jacks were recorded, representing 28.0 percent of that year's total chinook salmon counted.

4. The sockeye count of 19,233 was slightly less than one-third the 1960 count of 60,341 and considerably less than the 28-year mean of 53,079. A greater percentage of sockeye salmon utilized the left bank ladder than used either the middle or right bank ladders. In 1961, sockeye salmon under 16 inches in length comprised 18.2 percent of the count.

5. Very few coho salmon have appeared at Rock Island Dam in the period 1933-61. The greatest count, 229, occurred in 1947. The 1961 count of 50 fish was slightly more than half the 1960 count.

6. The steelhead count of 7,042 in 1961 exceeded the 28-year mean of 3,063 and was the highest recorded in the period 1933-61.

7. Fish counting in 1961 began on May 1 and terminated October 27. From May 1 to August 19 counting was conducted for 16 hours each day; from August 20 to September 30, 14 hours each day; and from October 1 to October 27, 8 hours each day.

8. In 1961 the maximum number of salmonids counted in one day (1,651) was on July 14.

9. Season's total of fish other than salmon and steelhead trout passing Rock Island Dam in 1961 was 140,173, and was composed of the following: sucker, 76,797; squawfish, 15,174; whitefish, 23,124; chub, 6,754; and "other fish," composed largely of lamprey and carp, 18,324.

10. Of 40,764 fish examined, on the top and one side only, as they passed over the counting boards, approximately 1.06 percent had injuries of some type either on the body or about the head. Greatest numbers of injured fish occurred in July and August. Injuries were most numerous on large chinook and sockeye salmon.

11. High water conditions at Rock Island Dam made the fish ladders inoperative from June 9 to 13, inclusive.

Table 1.--Annual counts of salmon and steelhead trout at Rock Island Dam, 1933-61.

| Year | Chinook salmon | Steelhead trout | Sockeye salmon | Coho salmon | Total |
|---|---|---|---|---|---|
| 1933 | 5,668[1] | 1,055[1] | 40,737 | 182 | 47,642 |
| 1934 | 6,482[1] | 583 | 2,227 | 69 | 9,361 |
| 1935 | 16,310[1] | 5,412[1] | 14,013 | 10 | 35,745 |
| 1936 | 7,396[1] | 2,369[1] | 16,501 | 0 | 26,266 |
| 1937 | 5,133 | 2,214[1] | 15,089 | 58 | 22,494 |
| 1938 | 5,803 | 2,400[1] | 17,123 | 78 | 25,404 |
| 1939 | 11,206 | 5,427[1] | 19,591 | 13 | 36,237 |
| 1940 | 9,492 | 5,550 | 26,894 | 2 | 41,938 |
| 1941 | 2,571 | 3,561 | 949 | 29 | 7,110 |
| 1942 | 6,814 | 3,586 | 16,282 | 1 | 26,683 |
| 1943 | 11,145 | 2,249 | 17,665 | 22 | 31,081 |
| 1944 | 3,375 | 1,329 | 4,932 | 186 | 9,822 |
| 1945 | 5,696 | 1,121 | 7,142 | 166 | 14,125 |
| 1946 | 9,992 | 1,761 | 45,029 | 32 | 56,814 |
| 1947 | 11,766 | 2,115 | 79,834 | 229 | 93,944 |
| 1948 | 7,083 | 2,360 | 84,184 | 29 | 93,656 |
| 1949 | 12,353 | 2,470 | 18,600 | 40 | 33,463 |
| 1950 | 10,348 | 1,852 | 50,134 | 72 | 62,406 |
| 1951 | 18,752 | 3,121 | 101,826 | 8 | 123,707 |
| 1952 | 20,121 | 2,883 | 114,349 | 27 | 137,380 |
| 1953 | 31,080 | 4,001 | 151,747 | 40 | 186,868 |
| 1954 | 33,283 | 5,407 | 91,234 | 44 | 129,968 |
| 1955 | 25,658 | 3,141 | 155,055 | 39 | 183,893 |
| 1956 | 25,085 | 1,540 | 92,443 | 29 | 119,097 |
| 1957 | 50,713 | 3,927 | 71,261 | 27 | 125,928 |
| 1958[2] | 32,457 | 3,970 | 98,695 | 60 | 135,182 |
| 1959[2] | 23,352 | 4,138 | 72,351 | 118 | 99,959 |
| 1960 | 26,550 | 6,226 | 60,341 | 94 | 93,211 |
| 1961 | 33,067 | 7,042 | 19,233 | 50 | 59,392 |

[1] Incomplete count.

[2] Counts for the period from May 4 through July 15, 1959 were computed by extrapolating sample counts.

Table 2.--Monthly totals of all anadromous fish counted at Rock Island Dam, 1961.

| Species | May | June | July | August | Sept. | Oct. | Total |
|---|---|---|---|---|---|---|---|
| Chinook | 4,520 | 2,151 | 5,720 | 6,413 | 4,363 | 640 | 23,807 |
| Chinook (jacks) | 450 | 960 | 934 | 3,094 | 3,409 | 413 | 9,260 |
| Steelhead | 295 | 22 | 167 | 931 | 3,508 | 2,119 | 7,042 |
| Sockeye (large) | 16 | 164 | 12,472 | 3,026 | 56 | 2 | 15,736 |
| Sockeye (small) | 3 | 48 | 2,487 | 956 | 3 | 0 | 3,497 |
| Coho | 0 | 0 | 0 | 0 | 19 | 31 | 50 |
| Total fish | 5,284 | 3,345 | 21,780 | 14,420 | 11,358 | 3,205 | 59,392 |

Table 3.--Maximum daily counts, salmon and steelhead, Rock Island Dam, 1961.

| Species | Date | Number of fish |
|---|---|---|
| Chinook (except jacks) | Aug. 7 | 692 |
| Chinook (jacks) | Sept. 18 | 199 |
| Steelhead | Sept. 19 | 269 |
| Sockeye (large) | July 14 | 1,133 |
| Sockeye (small) | July 21 | 190 |
| Coho | Oct. 4 | 8 |

Table 4.--Number and percent of chinook salmon counted over each fish ladder, Rock Island Dam, 1961

(jacks not included).

| Date | Left ladder | | Middle ladder | | Right ladder | | Total |
|---|---|---|---|---|---|---|---|
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | |
| May 1-15 | 872 | 33.3 | 672 | 25.7 | 1,075 | 41.0 | 2,619 |
| May 16-31 | 290 | 15.3 | 1,324 | 69.7 | 287 | 15.0 | 1,901 |
| June 1-15 | 570 | 44.0 | 463 | 35.7 | 262 | 20.3 | 1,295 |
| June 16-30 | 312 | 36.5 | 123 | 14.4 | 421 | 49.1 | 856 |
| July 1-15 | 2,023 | 64.6 | 220 | 7.0 | 890 | 28.4 | 3,133 |
| July 16-31 | 1,996 | 77.1 | 48 | 1.9 | 543 | 21.0 | 2,587 |
| Aug. 1-15 | 4,100 | 89.2 | 324 | 7.1 | 172 | 3.7 | 4,596 |
| Aug. 16-31 | 1,345 | 74.0 | 83 | 4.6 | 389 | 21.4 | 1.817 |
| Sept. 1-15 | 1,140 | 65.5 | 160 | 9.3 | 438 | 25.2 | 1,738 |
| Sept. 16-30 | 1,760 | 67.0 | 113 | 4.4 | 752 | 28.6 | 2,625 |
| Oct. 1-15 | 285 | 56.3 | 70 | 13.8 | 151 | 29.9 | 506 |
| Oct. 16-27 | 77 | 57.4 | 9 | 6.7 | 48 | 35.9 | 134 |
| Total | 14,770 | 62.0 | 3,609 | 15.2 | 5,428 | 22.8 | 23,807 |

Table 5.--Number and percent of chinook salmon jacks counted over each fish ladder, Rock Island Dam, 1961.

| Date | Left ladder | | Middle ladder | | Right ladder | | Total |
|---|---|---|---|---|---|---|---|
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | |
| May 1-15 | 42 | 19.4 | 84 | 38.9 | 90 | 41.7 | 216 |
| May 16-31 | 54 | 23.1 | 123 | 52.6 | 57 | 24.3 | 234 |
| June 1-15 | 189 | 44.7 | 63 | 14.9 | 171 | 40.4 | 423 |
| June 16-30 | 272 | 50.7 | 54 | 10.0 | 211 | 39.3 | 537 |
| July 1-15 | 202 | 51.5 | 54 | 13.8 | 136 | 34.7 | 392 |
| July 16-31 | 349 | 64.4 | 36 | 6.6 | 157 | 29.0 | 542 |
| Aug. 1-15 | 1,062 | 83.3 | 146 | 11.4 | 67 | 5.3 | 1,275 |
| Aug. 16-31 | 1,604 | 88.1 | 63 | 3.5 | 152 | 8.4 | 1,819 |
| Sept. 1-15 | 1,622 | 86.3 | 85 | 4.6 | 171 | 9.1 | 1,878 |
| Sept. 16-30 | 1,267 | 82.9 | 59 | 3.9 | 203 | 13.2 | 1,531 |
| Oct. 1-15 | 292 | 88.0 | 13 | 3.9 | 27 | 8.1 | 332 |
| Oct. 16-27 | 64 | 79.0 | 1 | 1.0 | 16 | 20.0 | 81 |
| Total | 7,019 | 75.8 | 781 | 8.4 | 1,460 | 15.8 | 9,260 |

Table 6.--Number and percent of sockeye salmon (large) counted over each ladder, Rock Island Dam, 1961.

| Date | Left ladder | | Middle ladder | | Right ladder | | Total |
|---|---|---|---|---|---|---|---|
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | |
| May 1-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| May 16-31 | 4 | 25.0 | 11 | 68.0 | 1 | 7.0 | 16 |
| June 1-15 | 22 | 44.0 | 10 | 20.0 | 18 | 36.0 | 50 |
| June 16-30 | 72 | 63.2 | 1 | 0.8 | 41 | 36.0 | 114 |
| July 1-15 | 2,295 | 62.0 | 361 | 9.8 | 1,045 | 28.2 | 3,701 |
| July 16-31 | 5,636 | 64.3 | 680 | 7.7 | 2,455 | 28.0 | 8,771 |
| Aug. 1-15 | 1,765 | 71.6 | 471 | 19.1 | 229 | 9.3 | 2,465 |
| Aug. 16-31 | 377 | 67.2 | 54 | 9.6 | 130 | 23.2 | 561 |
| Sept. 1-15 | 27 | 65.9 | 3 | 7.3 | 11 | 26.8 | 41 |
| Sept. 16-30 | 14 | 93.0 | 0 | 0 | 1 | 7.0 | 15 |
| Oct. 1-15 | 2 | 100.0 | 0 | 0 | 0 | 0 | 2 |
| Oct. 16-27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 10,214 | 64.9 | 1,591 | 10.1 | 3,931 | 25.0 | 15,736 |

Table 7.--Number and percent of sockeye salmon (small) counted over each ladder, Rock Island Dam, 1961.

| Date | Left ladder | | Middle ladder | | Righ ladder | | Total |
|---|---|---|---|---|---|---|---|
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | |
| May 1-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| May 16-31 | 1 | 33.0 | 2 | 67.0 | 0 | 0 | 3 |
| June 1-15 | 10 | 50.0 | 3 | 15.0 | 7 | 35.0 | 20 |
| June 16-30 | 10 | 35.7 | 0 | 0 | 18 | 64.3 | 28 |
| July 1-15 | 427 | 65.4 | 66 | 10.0 | 161 | 24.6 | 654 |
| July 16-31 | 1,238 | 67.6 | 118 | 6.4 | 477 | 26.0 | 1,833 |
| Aug. 1-15 | 645 | 77.0 | 107 | 12.8 | 85 | 10.2 | 837 |
| Aug. 16-31 | 75 | 63.0 | 19 | 16.0 | 25 | 21.0 | 119 |
| Sept. 1-15 | 3 | 100.0 | 0 | 0 | 0 | 0 | 3 |
| Sept. 16-30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 1-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct. 16-27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2,409 | 68.9 | 315 | 9.0 | 773 | 22.1 | 3,497 |

Table 8.--Number and percent of steelhead trout counted over each ladder, Rock Island Dam, 1961.

| Date | Left ladder | | Middle ladder | | Right ladder | | Total |
|---|---|---|---|---|---|---|---|
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | |
| May 1-15 | 82 | 35.5 | 42 | 18.2 | 107 | 46.3 | 231 |
| May 16-31 | 17 | 25.5 | 30 | 47.0 | 17 | 25.5 | 64 |
| June 1-15 | 5 | 38.5 | 7 | 53.8 | 1 | 7.7 | 13 |
| June 16-30 | 4 | 44.4 | 4 | 44.5 | 1 | 11.1 | 9 |
| July 1-15 | 21 | 65.7 | 2 | 6.2 | 9 | 28.1 | 32 |
| July 16-31 | 108 | 80.0 | 2 | 1.5 | 25 | 18.5 | 135 |
| Aug. 1-15 | 358 | 77.0 | 52 | 11.2 | 55 | 11.8 | 465 |
| Aug. 16-31 | 332 | 71.2 | 27 | 5.8 | 107 | 23.0 | 466 |
| Sept. 1-15 | 807 | 83.8 | 71 | 7.4 | 85 | 8.8 | 963 |
| Sept. 16-30 | 1,864 | 73.2 | 327 | 12.8 | 354 | 14.0 | 2,545 |
| Oct. 1-15 | 1,131 | 77.5 | 230 | 15.7 | 99 | 6.8 | 1,460 |
| Oct. 16-27 | 528 | 80.1 | 61 | 9.3 | 70 | 10.6 | 659 |
| Total | 5,257 | 74.7 | 855 | 12.1 | 930 | 13.2 | 7,042 |

Table 9.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, May 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| May 1 | 59 | 51 | 49 | -- | 137 | 0 | 0 | 44 | 181 |
| 2 | 53 | 51 | 47 | 113,300 | 158 | 0 | 0 | 42 | 200 |
| 3 | 53 | 48 | 48 | 110,900 | 140 | 0 | 0 | 24 | 164 |
| 4 | 52 | 48 | 48 | 115,000 | 86 | 0 | 0 | 3 | 89 |
| 5 | 48 | 48 | 48 | 112,500 | 175 | 0 | 0 | 23 | 198 |
| 6 | 70 | 53 | 48 | 121,600 | 257 | 0 | 0 | 11 | 268 |
| 7 | 65 | 53 | 47 | 125,800 | 331 | 0 | 0 | 18 | 349 |
| 8 | 60 | 54 | 48 | 137,200 | 259 | 0 | 0 | 10 | 269 |
| 9 | 55 | 50 | 48 | 151,800 | 116 | 0 | 0 | 10 | 126 |
| 10 | 59 | 48 | 48 | 178,000 | 130 | 0 | 0 | 6 | 136 |
| 11 | 59 | 41 | 48 | 187,800 | 79 | 0 | 0 | 5 | 84 |
| 12 | 72 | 51 | 48 | 198,000 | 173 | 0 | 0 | 8 | 181 |
| 13 | 59 | 52 | 49 | 212,600 | 489 | 0 | 0 | 15 | 504 |
| 14 | 70 | 51 | 49 | 205,800 | 152 | 0 | 0 | 2 | 154 |
| 15 | 78 | 53 | 50 | 216,600 | 153 | 0 | 0 | 10 | 163 |
| 16 | 78 | 53 | 50 | 239,000 | 227 | 0 | 0 | 9 | 236 |
| 17 | 82 | 51 | 50 | 241,000 | 187 | 0 | 0 | 4 | 191 |
| 18 | 76 | 50 | 50 | 260,900 | 220 | 0 | 0 | 7 | 227 |
| 19 | 82 | 51 | 50 | 258,900 | 131 | 0 | 0 | 5 | 136 |
| 20 | -- | -- | 51 | 249,000 | 161 | 0 | 0 | 7 | 168 |
| 21 | 83 | 55 | 51 | 249,000 | 256 | 0 | 0 | 12 | 268 |
| 22 | 78 | 52 | 51 | 262,200 | 100 | 0 | 0 | 2 | 102 |
| 23 | 76 | 56 | 51 | 285,800 | 116 | 0 | 0 | 3 | 119 |
| 24 | 74 | 46 | 51 | 308,100 | 72 | 0 | 0 | 1 | 73 |
| 25 | 86 | 50 | 52 | 330,200 | 143 | 3 | 0 | 2 | 148 |
| 26 | 68 | 56 | 51 | 360,800 | 171 | 0 | 0 | 3 | 174 |
| 27 | 72 | 52 | 51 | 369,400 | 61 | 0 | 0 | 0 | 61 |
| 28 | 72 | 60 | 51 | 371,000 | 60 | 0 | 0 | 3 | 63 |
| 29 | 71 | 58 | 51 | 394,900 | 71 | 6 | 0 | 1 | 78 |
| 30 | 71 | 58 | 51 | 394,900 | 67 | 5 | 0 | 2 | 74 |
| 31 | 76 | 58 | 52 | 413,600 | 92 | 5 | 0 | 3 | 100 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

Table 10.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, June 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| June 1 | 87 | 60 | 53 | 417,400 | 288 | 13 | 0 | 6 | 307 |
| 2 | 88 | 60 | 53 | 444,500 | 95 | 10 | 0 | 1 | 106 |
| 3 | 88 | 66 | 54 | 452,300 | 49 | 11 | 0 | 1 | 61 |
| 4 | 87 | 63 | 54 | 466,000 | 49 | 7 | 0 | 2 | 58 |
| 5 | 84 | 62 | 54 | 488,500 | 42 | 2 | 0 | 2 | 46 |
| 6 | 76 | 54 | 54 | 496,100 | 20 | 4 | 0 | 0 | 24 |
| 7 | 74 | 50 | 54 | 517,900 | 10 | 2 | 0 | 0 | 12 |
| 8 | 76 | 50 | 54 | 517,400 | 17 | 6 | 0 | 0 | 23 |
| 9 | 76 | 50 | 54 | 528,000 | 2 | 1 | 0 | 0 | 3 |
| 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | -- | -- | -- | 534,900 | -- | -- | -- | -- | -- |
| 12 | -- | -- | -- | 526,900 | -- | -- | -- | -- | -- |
| 13 | -- | -- | -- | 518,600 | -- | -- | -- | -- | -- |
| 14 | 93 | 60 | 56 | 513,300 | 924 | 6 | 0 | 0 | 930 |
| 15 | 96 | 67 | 56 | 510,000 | 222 | 8 | 0 | 1 | 231 |
| 16 | 100 | 70 | 57 | 477,000 | 131 | 4 | 0 | 2 | 137 |
| 17 | 100 | 75 | 57 | 467,700 | 157 | 0 | 0 | 0 | 157 |
| 18 | 92 | 68 | 57 | 490,000 | 82 | 2 | 0 | 1 | 85 |
| 19 | 93 | 68 | 56 | 499,300 | 117 | 14 | 0 | 0 | 131 |
| 20 | 87 | 64 | 56 | 487,100 | 113 | 6 | 0 | 0 | 119 |
| 21 | 85 | 58 | 56 | 470,500 | 77 | 7 | 0 | 1 | 85 |
| 22 | 90 | 58 | 56 | 471,200 | 44 | 4 | 0 | 0 | 48 |
| 23 | 95 | 56 | 57 | 447,500 | 63 | 4 | 0 | 0 | 67 |
| 24 | 96 | 68 | 57 | 415,500 | 76 | 1 | 0 | 1 | 78 |
| 25 | 91 | 72 | 57 | 413,600 | 73 | 6 | 0 | 1 | 80 |
| 26 | 78 | 70 | 58 | 404,200 | 69 | 17 | 0 | 1 | 87 |
| 27 | 85 | 54 | 58 | 383,900 | 69 | 8 | 0 | 0 | 77 |
| 28 | 85 | 60 | 58 | 360,800 | 68 | 17 | 0 | 1 | 86 |
| 29 | 74 | 60 | 59 | 345,300 | 93 | 20 | 0 | 0 | 113 |
| 30 | 85 | 51 | 59 | 331,800 | 161 | 32 | 0 | 1 | 194 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

Table 11.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, July 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| July 1 | 80 | 59 | 59 | 313,400 | 158 | 38 | 0 | 0 | 196 |
| 2 | 89 | 60 | 59 | 299,200 | 153 | 35 | 0 | 0 | 188 |
| 3 | 89 | 60 | 59 | 287,700 | 198 | 34 | 0 | 0 | 232 |
| 4 | 96 | 70 | 60 | 274,800 | 167 | 48 | 0 | 0 | 215 |
| 5 | 81 | 68 | 60 | 241,500 | 252 | 68 | 0 | 0 | 320 |
| 6 | 82 | 58 | 60 | 245,700 | 218 | 107 | 0 | 1 | 326 |
| 7 | 79 | 55 | 60 | 234,700 | 311 | 109 | 0 | 1 | 421 |
| 8 | 88 | 64 | 60 | 230,000 | 355 | 141 | 0 | 3 | 499 |
| 9 | 90 | 67 | 60 | 216,600 | 242 | 168 | 0 | 3 | 413 |
| 10 | 95 | 64 | 61 | 208,500 | 220 | 153 | 0 | 1 | 374 |
| 11 | 98 | 67 | 61 | 200,500 | 197 | 302 | 0 | 1 | 500 |
| 12 | 103 | 72 | 61 | 199,200 | 210 | 335 | 0 | 4 | 549 |
| 13 | 104 | 74 | 62 | 201,800 | 288 | 543 | 0 | 4 | 835 |
| 14 | 90 | 78 | 62 | 184,100 | 357 | 1,289 | 0 | 5 | 1,651 |
| 15 | 91 | 72 | 62 | 182,900 | 199 | 985 | 0 | 9 | 1,193 |
| 16 | 83 | 74 | 62 | 182,900 | 122 | 641 | 0 | 3 | 766 |
| 17 | 90 | 66 | 63 | 176,900 | 74 | 429 | 0 | 0 | 503 |
| 18 | 92 | 66 | 63 | 181,700 | 113 | 654 | 0 | 1 | 768 |
| 19 | 95 | 68 | 63 | 176,900 | 170 | 799 | 0 | 7 | 976 |
| 20 | 105 | 74 | 63 | 173,400 | 215 | 649 | 0 | 5 | 869 |
| 21 | 101 | 78 | 63 | 172,300 | 272 | 1,063 | 0 | 9 | 1,344 |
| 22 | 95 | 78 | 64 | 172,300 | 192 | 967 | 0 | 2 | 1,161 |
| 23 | 88 | 75 | 64 | 181,700 | 131 | 911 | 0 | 4 | 1,046 |
| 24 | 87 | 65 | 65 | 170,000 | 253 | 757 | 0 | 3 | 1,013 |
| 25 | 88 | 63 | 65 | 176,900 | 254 | 619 | 0 | 10 | 883 |
| 26 | 91 | 67 | 65 | 179,200 | 220 | 553 | 0 | 10 | 783 |
| 27 | 92 | 72 | 65 | 173,400 | 216 | 612 | 0 | 6 | 834 |
| 28 | 84 | 66 | 65 | 156,900 | 229 | 610 | 0 | 15 | 854 |
| 29 | 86 | 60 | 65 | 149,800 | 162 | 497 | 0 | 31 | 690 |
| 30 | 90 | 61 | 65 | 137,200 | 289 | 380 | 0 | 17 | 686 |
| 31 | 95 | 67 | 64 | 130,100 | 217 | 463 | 0 | 12 | 692 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

Table 12.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, August 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| Aug. 1 | 95 | 69 | 64 | 133,600 | 492 | 324 | 0 | 9 | 825 |
| 2 | 103 | 68 | 64 | 124,100 | 275 | 266 | 0 | 6 | 547 |
| 3 | 103 | 70 | 64 | 106,300 | 253 | 387 | 0 | 12 | 652 |
| 4 | 108 | 71 | 65 | 111,700 | 473 | 417 | 0 | 33 | 923 |
| 5 | 86 | 76 | 64 | 115,000 | 704 | 359 | 0 | 36 | 1,099 |
| 6 | 90 | 63 | 64 | 114,100 | 301 | 207 | 0 | 28 | 536 |
| 7 | 94 | 67 | 64 | 104,800 | 775 | 261 | 0 | 59 | 1,095 |
| 8 | 94 | 68 | 65 | 99,800 | 515 | 309 | 0 | 41 | 865 |
| 9 | 92 | 67 | 65 | 105,600 | 443 | 183 | 0 | 21 | 647 |
| 10 | 94 | 61 | 65 | 100,500 | 381 | 112 | 0 | 33 | 526 |
| 11 | 96 | 61 | 65 | 98,400 | 306 | 131 | 0 | 41 | 478 |
| 12 | 98 | 61 | 65 | 104,800 | 159 | 149 | 0 | 30 | 338 |
| 13 | 88 | 66 | 65 | 127,500 | 455 | 100 | 0 | 53 | 608 |
| 14 | 100 | 70 | 65 | 124,100 | 145 | 53 | 0 | 31 | 229 |
| 15 | 92 | 70 | 65 | 107,900 | 294 | 44 | 0 | 32 | 370 |
| 16 | 85 | 62 | 65 | 99,800 | 361 | 63 | 0 | 39 | 463 |
| 17 | 85 | 62 | 66 | 97,700 | 227 | 51 | 0 | 32 | 320 |
| 18 | 95 | 60 | 66 | 77,100 | 427 | 90 | 0 | 47 | 564 |
| 19 | 100 | 65 | 66 | 87,500 | 167 | 112 | 0 | 29 | 308 |
| 20 | 98 | 79 | 66 | 78,400 | 163 | 38 | 0 | 33 | 234 |
| 21 | 90 | 67 | 67 | 80,300 | 226 | 74 | 0 | 25 | 325 |
| 22 | 99 | 67 | 66 | 80,300 | 184 | 67 | 0 | 35 | 286 |
| 23 | 102 | 74 | 66 | 84,200 | 155 | 34 | 0 | 21 | 210 |
| 24 | 85 | 70 | 66 | 90,000 | 165 | 46 | 0 | 38 | 249 |
| 25 | 88 | 58 | 66 | 90,200 | 285 | 34 | 0 | 21 | 340 |
| 26 | 85 | 60 | 66 | 98,400 | 237 | 24 | 0 | 39 | 290 |
| 27 | 86 | 62 | 66 | 99,800 | 209 | 10 | 0 | 15 | 234 |
| 28 | 90 | 62 | 66 | 98,400 | 199 | 6 | 0 | 27 | 232 |
| 29 | 92 | 62 | 66 | 94,900 | 170 | 13 | 0 | 20 | 203 |
| 30 | 88 | 67 | 66 | 86,200 | 196 | 14 | 0 | 17 | 227 |
| 31 | 79 | 67 | 66 | 85,500 | 165 | 4 | 0 | 28 | 197 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

Table 13.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, September 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| Sept. 1 | 67 | 53 | 66 | 79,700 | 270 | 3 | 0 | 30 | 303 |
| 2 | 74 | 56 | 65 | 77,100 | 229 | 6 | 0 | 25 | 260 |
| 3 | 85 | 60 | 65 | 90,900 | 227 | 3 | 0 | 27 | 257 |
| 4 | 89 | 66 | 65 | 79,100 | 220 | 1 | 0 | 35 | 256 |
| 5 | 76 | 64 | 65 | 74,600 | 261 | 2 | 0 | 32 | 295 |
| 6 | 76 | 50 | 65 | 80,300 | 238 | 1 | 0 | 31 | 270 |
| 7 | 77 | 54 | 65 | 70,200 | 173 | 4 | 0 | 42 | 219 |
| 8 | 80 | 48 | 65 | 76,500 | 289 | 4 | 0 | 70 | 363 |
| 9 | 85 | 58 | 65 | 75,900 | 197 | 1 | 0 | 82 | 280 |
| 10 | 85 | 58 | 65 | 75,200 | 177 | 2 | 0 | 56 | 235 |
| 11 | 80 | 53 | 65 | 76,500 | 239 | 2 | 1 | 68 | 310 |
| 12 | 74 | 52 | 65 | 73,400 | 269 | 3 | 1 | 81 | 354 |
| 13 | 79 | 50 | 65 | 77,100 | 252 | 0 | 0 | 138 | 390 |
| 14 | 78 | 50 | 64 | 73,400 | 350 | 5 | 1 | 151 | 507 |
| 15 | 82 | 56 | 64 | 62,200 | 225 | 7 | 0 | 95 | 327 |
| 16 | 85 | 59 | 64 | 51,200 | 272 | 0 | 0 | 76 | 348 |
| 17 | 87 | 59 | 65 | 68,500 | 645 | 3 | 0 | 190 | 838 |
| 18 | 80 | 58 | 65 | 42,000 | 633 | 1 | 0 | 234 | 868 |
| 19 | 78 | 56 | 65 | 56,000 | 412 | 3 | 1 | 269 | 685 |
| 20 | 65 | 50 | 64 | 65,000 | 362 | 2 | 0 | 240 | 604 |
| 21 | 72 | 39 | 64 | 61,600 | 260 | 1 | 0 | 171 | 432 |
| 22 | 70 | 42 | 64 | 54,900 | 312 | 0 | 0 | 214 | 526 |
| 23 | 68 | 43 | 63 | 59,400 | 245 | 0 | 3 | 172 | 420 |
| 24 | 75 | 44 | 64 | 54,900 | 165 | 0 | 2 | 154 | 321 |
| 25 | 75 | 54 | 63 | 54,900 | 127 | 1 | 2 | 114 | 244 |
| 26 | 65 | 42 | 63 | 54,300 | 98 | 0 | 1 | 90 | 189 |
| 27 | 66 | 50 | 63 | 53,200 | 159 | 0 | 0 | 136 | 295 |
| 28 | 59 | 50 | 62 | 52,200 | 161 | 2 | 0 | 160 | 323 |
| 29 | 59 | 42 | 62 | 65,600 | 173 | 0 | 6 | 175 | 354 |
| 30 | 70 | 50 | 62 | 54,300 | 132 | 2 | 1 | 150 | 285 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

Table 14.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, October 1961.

| Date | Air temperatures[1] Max. | Air temperatures[1] Min. | Water temperature[2] | Stream flow (c.f.s.) | Chinook | Sockeye | Coho | Steelhead | Total |
|---|---|---|---|---|---|---|---|---|---|
| Oct. 1 | 67 | 44 | 62 | 56,000 | 71 | 0 | 2 | 61 | 134 |
| 2 | 75 | 42 | 62 | 56,600 | 90 | 2 | 1 | 79 | 172 |
| 3 | 75 | 42 | 62 | 67,900 | 128 | 0 | 3 | 114 | 245 |
| 4 | 73 | 43 | 62 | 54,300 | 76 | 0 | 8 | 128 | 212 |
| 5 | 74 | 54 | 62 | 55,400 | 75 | 0 | 1 | 106 | 182 |
| 6 | 58 | 54 | 62 | 53,200 | 73 | 0 | 3 | 113 | 189 |
| 7 | 58 | 39 | 61 | 41,400 | 43 | 0 | 0 | 140 | 183 |
| 8 | 62 | 39 | 61 | 62,200 | 62 | 0 | 3 | 139 | 205 |
| 9 | 61 | 41 | 61 | 62,700 | 60 | 0 | 1 | 124 | 185 |
| 10 | 62 | 50 | 60 | 67,900 | 35 | 0 | 1 | 99 | 135 |
| 11 | 59 | 43 | 60 | 53,300 | 37 | 0 | 0 | 87 | 124 |
| 12 | 55 | 42 | 59 | 38,000 | 22 | 0 | 0 | 38 | 60 |
| 13 | 75 | 45 | 60 | 44,300 | 18 | 0 | 0 | 49 | 67 |
| 14 | 73 | 45 | 60 | 43,500 | 20 | 0 | 0 | 88 | 108 |
| 15 | 74 | 48 | 60 | 43,900 | 28 | 0 | 1 | 95 | 124 |
| 16 | 68 | 48 | 60 | 47,800 | 26 | 0 | 0 | 94 | 120 |
| 17 | 65 | 42 | 60 | 58,800 | 24 | 0 | 2 | 31 | 57 |
| 18 | 58 | 35 | 60 | 74,600 | 13 | 0 | 0 | 43 | 56 |
| 19 | 60 | 34 | 60 | 77,100 | 34 | 0 | 1 | 82 | 117 |
| 20 | 56 | 34 | 59 | 87,800 | 33 | 0 | 0 | 78 | 111 |
| 21 | 54 | 38 | 59 | 54,900 | 17 | 0 | 0 | 72 | 89 |
| 22 | 56 | 34 | 58 | 49,700 | 17 | 0 | 0 | 59 | 76 |
| 23 | 54 | 32 | 58 | 65,600 | 16 | 0 | 1 | 45 | 62 |
| 24 | 56 | 33 | 58 | 69,000 | 17 | 0 | 1 | 36 | 54 |
| 25 | 54 | 38 | 57 | 74,000 | 8 | 0 | 1 | 43 | 52 |
| 26 | 58 | 38 | 57 | 75,200 | 6 | 0 | 1 | 45 | 52 |
| 27 | 53 | 39 | 57 | 74,000 | 4 | 0 | 0 | 31 | 35 |

[1] Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.
[2] Water temperatures, taken with recording thermometer at center ladder, are given in degrees Fahrenheit.

9. Miscellaneous fish count, Rock Island Dam, May 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1/] | Total |
|---|---|---|---|---|---|---|---|---|
| May 1 | 178 | 3 | 62 | 6 | 0 | 0 | 0 | 249 |
| 2 | 37 | 32 | 24 | 10 | 0 | 0 | 0 | 103 |
| 3 | 23 | 0 | 57 | 10 | 0 | 0 | 0 | 90 |
| 4 | 13 | 2 | 16 | 1 | 0 | 0 | 0 | 32 |
| 5 | 54 | 16 | 116 | 9 | 0 | 0 | 0 | 195 |
| 6 | 16 | 19 | 56 | 0 | 0 | 0 | 0 | 91 |
| 7 | 19 | 17 | 28 | 0 | 0 | 0 | 0 | 64 |
| 8 | 8 | 8 | 24 | 0 | 0 | 0 | 0 | 40 |
| 9 | 27 | 12 | 55 | 0 | 0 | 0 | 0 | 94 |
| 10 | 40 | 19 | 49 | 0 | 0 | 0 | 0 | 108 |
| 11 | 45 | 16 | 31 | 0 | 0 | 0 | 0 | 92 |
| 12 | 111 | 44 | 54 | 10 | 0 | 0 | 0 | 219 |
| 13 | 582 | 127 | 88 | 57 | 0 | 0 | 0 | 854 |
| 14 | 283 | 45 | 31 | 13 | 0 | 0 | 0 | 372 |
| 15 | 129 | 78 | 42 | 15 | 0 | 0 | 0 | 264 |
| 16 | 551 | 195 | 79 | 50 | 0 | 0 | 0 | 875 |
| 17 | 766 | 35 | 98 | 9 | 0 | 0 | 0 | 908 |
| 18 | 395 | 110 | 104 | 48 | 0 | 0 | 0 | 657 |
| 19 | 203 | 55 | 47 | 46 | 0 | 1 | 2 | 354 |
| 20 | 187 | 81 | 42 | 22 | 0 | 0 | 0 | 332 |
| 21 | 171 | 71 | 30 | 15 | 0 | 0 | 0 | 287 |
| 22 | 85 | 36 | 26 | 9 | 0 | 0 | 0 | 156 |
| 23 | 50 | 15 | 9 | 3 | 0 | 0 | 0 | 77 |
| 24 | 35 | 18 | 6 | 3 | 0 | 0 | 0 | 62 |
| 25 | 54 | 32 | 18 | 3 | 0 | 0 | 0 | 107 |
| 26 | 104 | 39 | 49 | 28 | 0 | 0 | 0 | 220 |
| 27 | 47 | 6 | 7 | 1 | 0 | 0 | 0 | 61 |
| 28 | 22 | 4 | 4 | 0 | 1 | 0 | 0 | 31 |
| 29 | 38 | 9 | 14 | 2 | 0 | 0 | 0 | 63 |
| 30 | 20 | 8 | 2 | 1 | 0 | 0 | 0 | 31 |
| 31 | 32 | 9 | 4 | 1 | 0 | 0 | 0 | 46 |
| Total | 4,325 | 1,161 | 1,272 | 372 | 1 | 1 | 2 | 7,134 |

[1] Principally carp and lamprey.

Table 16.--Miscellaneous fish count, Rock Island Dam, June 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1/] | Total |
|---|---|---|---|---|---|---|---|---|
| June 1 | 60 | 46 | 4 | 20 | 0 | 0 | 0 | 130 |
| 2 | 52 | 43 | 12 | 21 | 0 | 0 | 0 | 128 |
| 3 | 40 | 18 | 9 | 6 | 0 | 0 | 2 | 75 |
| 4 | 36 | 5 | 3 | 5 | 0 | 0 | 1 | 50 |
| 5 | 15 | 7 | 2 | 2 | 0 | 0 | 0 | 26 |
| 6 | 17 | 7 | 2 | 0 | 0 | 0 | 0 | 26 |
| 7 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 7 |
| 8 | 8 | 7 | 0 | 0 | 0 | 1 | 0 | 16 |
| 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 10 | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | -- | -- | -- | -- | -- | -- | -- | -- |
| 12 | -- | -- | -- | -- | -- | -- | -- | -- |
| 13 | -- | -- | -- | -- | -- | -- | -- | -- |
| 14 | 234 | 28 | 0 | 28 | 0 | 0 | 0 | 290 |
| 15 | 136 | 19 | 3 | 0 | 0 | 0 | 2 | 160 |
| 16 | 157 | 84 | 5 | 6 | 0 | 0 | 2 | 254 |
| 17 | 273 | 94 | 1 | 15 | 0 | 0 | 2 | 385 |
| 18 | 179 | 21 | 0 | 5 | 0 | 0 | 1 | 206 |
| 19 | 92 | 13 | 0 | 4 | 0 | 0 | 1 | 110 |
| 20 | 101 | 7 | 0 | 2 | 0 | 0 | 0 | 110 |
| 21 | 74 | 9 | 0 | 0 | 0 | 0 | 1 | 84 |
| 22 | 100 | 15 | 0 | 1 | 0 | 0 | 0 | 116 |
| 23 | 118 | 51 | 8 | 2 | 0 | 0 | 2 | 181 |
| 24 | 177 | 199 | 9 | 8 | 0 | 0 | 1 | 394 |
| 25 | 357 | 65 | 5 | 2 | 0 | 0 | 0 | 429 |
| 26 | 451 | 140 | 9 | 26 | 0 | 1 | 3 | 630 |
| 27 | 187 | 104 | 1 | 4 | 0 | 0 | 1 | 297 |
| 28 | 874 | 359 | 8 | 5 | 0 | 0 | 4 | 1,250 |
| 29 | 897 | 257 | 2 | 0 | 0 | 0 | 18 | 1,174 |
| 30 | 575 | 238 | 1 | 11 | 0 | 0 | 20 | 845 |
| | 5,218 | 1,837 | 84 | 174 | 0 | 2 | 61 | 7,376 |

[1] Principally carp and lamprey.

Table 17. Miscellaneous fish count, Rock Island Dam, July 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1/] | Total |
|---|---|---|---|---|---|---|---|---|
| July 1 | 1,093 | 366 | 23 | 13 | 0 | 0 | 29 | 1,524 |
| 2 | 875 | 364 | 12 | 6 | 0 | 0 | 68 | 1,325 |
| 3 | 502 | 288 | 27 | 9 | 0 | 0 | 73 | 899 |
| 4 | 972 | 259 | 8 | 12 | 0 | 0 | 57 | 1,308 |
| 5 | 961 | 171 | 10 | 13 | 0 | 0 | 77 | 1,232 |
| 6 | 359 | 88 | 4 | 11 | 1 | 0 | 53 | 516 |
| 7 | 131 | 71 | 13 | 8 | 0 | 0 | 83 | 306 |
| 8 | 264 | 229 | 8 | 4 | 0 | 0 | 62 | 567 |
| 9 | 408 | 130 | 19 | 11 | 0 | 0 | 85 | 653 |
| 10 | 655 | 186 | 10 | 13 | 0 | 0 | 96 | 960 |
| 11 | 799 | 230 | 6 | 10 | 0 | 0 | 48 | 1,093 |
| 12 | 602 | 126 | 10 | 9 | 0 | 0 | 101 | 848 |
| 13 | 603 | 74 | 8 | 8 | 0 | 0 | 64 | 757 |
| 14 | 238 | 94 | 15 | 10 | 0 | 0 | 83 | 440 |
| 15 | 185 | 81 | 30 | 10 | 0 | 0 | 62 | 368 |
| 16 | 120 | 75 | 34 | 5 | 0 | 0 | 96 | 330 |
| 17 | 108 | 91 | 20 | 8 | 0 | 0 | 105 | 332 |
| 18 | 153 | 89 | 14 | 6 | 0 | 0 | 55 | 317 |
| 19 | 159 | 117 | 28 | 9 | 0 | 0 | 67 | 380 |
| 20 | 131 | 112 | 23 | 5 | 0 | 0 | 64 | 335 |
| 21 | 119 | 109 | 23 | 12 | 2 | 0 | 94 | 359 |
| 22 | 225 | 185 | 20 | 8 | 0 | 0 | 77 | 515 |
| 23 | 423 | 170 | 18 | 4 | 0 | 0 | 101 | 716 |
| 24 | 127 | 50 | 23 | 3 | 0 | 0 | 84 | 287 |
| 25 | 427 | 102 | 24 | 11 | 0 | 0 | 100 | 664 |
| 26 | 565 | 92 | 16 | 9 | 1 | 0 | 110 | 793 |
| 27 | 537 | 142 | 29 | 15 | 0 | 0 | 213 | 936 |
| 28 | 403 | 148 | 19 | 36 | 0 | 0 | 235 | 841 |
| 29 | 309 | 127 | 28 | 18 | 0 | 0 | 129 | 611 |
| 30 | 1,081 | 139 | 28 | 3 | 0 | 0 | 117 | 1,368 |
| 31 | 440 | 77 | 55 | 5 | 0 | 0 | 118 | 695 |
| | 13,974 | 4,582 | 605 | 304 | 4 | 0 | 2,806 | 22,275 |

[1] Principally carp and lamprey.

Table 18.--Miscellaneous fish count, Rock Island Dam, August 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1/] | Total |
|---|---|---|---|---|---|---|---|---|
| Aug. 1 | 632 | 84 | 45 | 19 | 0 | 2 | 58 | 840 |
| 2 | 176 | 46 | 31 | 6 | 0 | 2 | 72 | 333 |
| 3 | 493 | 103 | 52 | 4 | 0 | 0 | 114 | 766 |
| 4 | 739 | 111 | 36 | 7 | 0 | 0 | 232 | 1,125 |
| 5 | 1,187 | 89 | 44 | 63 | 0 | 0 | 173 | 1,556 |
| 6 | 463 | 36 | 25 | 28 | 0 | 1 | 119 | 672 |
| 7 | 509 | 73 | 40 | 17 | 2 | 0 | 149 | 790 |
| 8 | 677 | 81 | 23 | 17 | 1 | 0 | 145 | 944 |
| 9 | 1,183 | 103 | 39 | 24 | 0 | 0 | 126 | 1,475 |
| 10 | 385 | 71 | 61 | 16 | 0 | 0 | 351 | 884 |
| 11 | 317 | 77 | 37 | 26 | 0 | 0 | 399 | 856 |
| 12 | 991 | 130 | 21 | 71 | 0 | 0 | 762 | 1,975 |
| 13 | 453 | 120 | 47 | 33 | 0 | 0 | 1,551 | 2,204 |
| 14 | 501 | 96 | 48 | 36 | 1 | 0 | 1,296 | 1,978 |
| 15 | 417 | 85 | 57 | 53 | 0 | 0 | 706 | 1,318 |
| 16 | 612 | 128 | 42 | 53 | 0 | 0 | 823 | 1,658 |
| 17 | 594 | 153 | 22 | 118 | 0 | 0 | 1,852 | 2,739 |
| 18 | 789 | 107 | 38 | 59 | 0 | 0 | 1,343 | 2,336 |
| 19 | 1,027 | 174 | 46 | 48 | 0 | 0 | 1,140 | 2,435 |
| 20 | 926 | 121 | 61 | 37 | 0 | 0 | 518 | 1,663 |
| 21 | 1,158 | 133 | 40 | 31 | 0 | 0 | 316 | 1,678 |
| 22 | 945 | 107 | 81 | 51 | 0 | 0 | 312 | 1,496 |
| 23 | 980 | 98 | 44 | 14 | 0 | 0 | 174 | 1,310 |
| 24 | 1,067 | 90 | 40 | 34 | 0 | 0 | 213 | 1,444 |
| 25 | 616 | 63 | 47 | 35 | 0 | 0 | 98 | 859 |
| 26 | 1,002 | 233 | 64 | 87 | 0 | 0 | 76 | 1,462 |
| 27 | 1,036 | 213 | 55 | 92 | 0 | 0 | 106 | 1,502 |
| 28 | 1,051 | 173 | 58 | 193 | 0 | 0 | 92 | 1,567 |
| 29 | 705 | 248 | 40 | 203 | 0 | 0 | 99 | 1,295 |
| 30 | 1,001 | 208 | 51 | 241 | 0 | 1 | 72 | 1,574 |
| 31 | 503 | 131 | 65 | 226 | 0 | 0 | 129 | 1,054 |
| | 23,135 | 3,685 | 1,400 | 1,942 | 4 | 6 | 13,616 | 43,788 |

[1] Principally carp and lamprey.

Table 19.--Miscellaneous fish count, Rock Island Dam, September 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1] | Total |
|---|---|---|---|---|---|---|---|---|
| Sept. 1 | 557 | 101 | 36 | 138 | 0 | 5 | 67 | 904 |
| 2 | 564 | 119 | 35 | 50 | 0 | 0 | 101 | 869 |
| 3 | 795 | 115 | 68 | 102 | 0 | 0 | 121 | 1,201 |
| 4 | 311 | 102 | 50 | 112 | 0 | 0 | 100 | 675 |
| 5 | 591 | 93 | 35 | 51 | 0 | 0 | 128 | 898 |
| 6 | 817 | 91 | 35 | 37 | 0 | 0 | 88 | 1,068 |
| 7 | 723 | 96 | 36 | 91 | 0 | 0 | 121 | 1,067 |
| 8 | 460 | 111 | 34 | 70 | 0 | 2 | 31 | 708 |
| 9 | 537 | 121 | 55 | 13 | 0 | 0 | 62 | 788 |
| 10 | 757 | 87 | 39 | 86 | 0 | 0 | 148 | 1,117 |
| 11 | 1,773 | 130 | 51 | 94 | 0 | 0 | 78 | 2,126 |
| 12 | 1,301 | 102 | 69 | 127 | 0 | 0 | 94 | 1,693 |
| 13 | 1,248 | 99 | 48 | 141 | 0 | 0 | 23 | 1,559 |
| 14 | 1,167 | 95 | 85 | 136 | 0 | 0 | 76 | 1,559 |
| 15 | 511 | 88 | 65 | 112 | 0 | 0 | 81 | 857 |
| 16 | 1,563 | 189 | 64 | 73 | 0 | 0 | 41 | 1,930 |
| 17 | 1,127 | 97 | 71 | 69 | 0 | 0 | 51 | 1,415 |
| 18 | 920 | 77 | 118 | 105 | 0 | 0 | 22 | 1,242 |
| 19 | 1,758 | 127 | 120 | 71 | 0 | 0 | 22 | 2,098 |
| 20 | 1,438 | 92 | 168 | 143 | 0 | 0 | 31 | 1,872 |
| 21 | 526 | 64 | 181 | 94 | 0 | 0 | 33 | 898 |
| 22 | 704 | 79 | 220 | 98 | 0 | 0 | 10 | 1,111 |
| 23 | 1,169 | 126 | 379 | 122 | 0 | 0 | 13 | 1,809 |
| 24 | 1,372 | 178 | 475 | 220 | 0 | 0 | 4 | 2,249 |
| 25 | 705 | 312 | 601 | 423 | 0 | 0 | 25 | 2,066 |
| 26 | 549 | 205 | 920 | 451 | 0 | 0 | 23 | 2,148 |
| 27 | 627 | 95 | 490 | 341 | 0 | 0 | 32 | 1,585 |
| 28 | 451 | 169 | 537 | 190 | 0 | 0 | 37 | 1,384 |
| 29 | 1,039 | 83 | 609 | 40 | 0 | 0 | 29 | 1,800 |
| 30 | 139 | 47 | 510 | 17 | 0 | 0 | 16 | 729 |
| | 26,199 | 3,490 | 6,204 | 3,817 | 0 | 7 | 1,708 | 41,425 |

[1] Principally carp and lamprey.

Table 20.--Miscellaneous fish count, Rock Island Dam, October 1961.

| Date | Sucker | Squawfish | Whitefish | Chub | Dolly Varden | Rainbow trout | Other[1] | Total |
|---|---|---|---|---|---|---|---|---|
| Oct. 1 | 65 | 24 | 366 | 8 | 0 | 0 | 11 | 474 |
| 2 | 94 | 31 | 369 | 6 | 0 | 0 | 10 | 510 |
| 3 | 449 | 30 | 275 | 7 | 0 | 0 | 7 | 768 |
| 4 | 181 | 22 | 174 | 0 | 0 | 0 | 10 | 387 |
| 5 | 77 | 9 | 148 | 4 | 0 | 0 | 4 | 242 |
| 6 | 96 | 11 | 152 | 6 | 0 | 0 | 5 | 270 |
| 7 | 70 | 9 | 156 | 3 | 0 | 0 | 1 | 239 |
| 8 | 267 | 16 | 142 | 5 | 0 | 0 | 0 | 430 |
| 9 | 257 | 9 | 226 | 0 | 0 | 0 | 2 | 494 |
| 10 | 384 | 36 | 153 | 4 | 0 | 0 | 6 | 583 |
| 11 | 96 | 14 | 240 | 10 | 0 | 0 | 5 | 365 |
| 12 | 217 | 33 | 227 | 9 | 0 | 0 | 0 | 486 |
| 13 | 122 | 9 | 366 | 0 | 0 | 0 | 2 | 499 |
| 14 | 83 | 21 | 527 | 2 | 0 | 0 | 2 | 635 |
| 15 | 154 | 21 | 497 | 0 | 0 | 0 | 1 | 673 |
| 16 | 252 | 20 | 534 | 5 | 0 | 0 | 1 | 812 |
| 17 | 143 | 6 | 739 | 5 | 0 | 0 | 2 | 895 |
| 18 | 132 | 27 | 1,003 | 4 | 0 | 0 | 3 | 1,169 |
| 19 | 287 | 29 | 856 | 6 | 0 | 0 | 4 | 1,182 |
| 20 | 277 | 25 | 1,638 | 1 | 0 | 0 | 1 | 1,942 |
| 21 | 136 | 11 | 1,071 | 3 | 0 | 0 | 2 | 1,223 |
| 22 | 89 | 11 | 811 | 3 | 0 | 0 | 1 | 915 |
| 23 | 322 | 24 | 582 | 4 | 0 | 0 | 3 | 935 |
| 24 | 115 | 2 | 635 | 4 | 0 | 0 | 1 | 757 |
| 25 | 62 | 11 | 402 | 0 | 0 | 0 | 1 | 476 |
| 26 | 65 | 7 | 384 | 0 | 0 | 0 | 0 | 456 |
| 27 | 53 | 9 | 406 | 0 | 0 | 0 | 0 | 468 |
| | 4,545 | 477 | 13,079 | 99 | 0 | 0 | 85 | 18,285 |

[1] Principally carp and lamprey.

Table 21.--Injured fish observed at Rock Island Dam, July 19-October 27, 1961.

| Date | Species | Total fish counted | Injured fish observed | | | Total injured fish |
|---|---|---|---|---|---|---|
| | | | Left ladder | Center ladder | Right ladder | |
| July 19-29 | Chinook | 1,878 | 35 | 0 | 7 | 42 |
| | Jacks | 436 | 1 | 0 | 0 | 1 |
| | Sockeye | 8,037 | 49 | 0 | 10 | 59 |
| | Steelhead | 102 | 1 | 0 | 0 | 1 |
| July 30-Aug. 12 | Chinook | 4,486 | 50 | 7 | 6 | 63 |
| | Jacks | 997 | 3 | 0 | 0 | 3 |
| | Sockeye | 3,948 | 93 | 3 | 1 | 97 |
| | Steelhead | 378 | 2 | 0 | 0 | 2 |
| Aug. 13-26 | Chinook | 2,045 | 42 | 2 | 8 | 52 |
| | Jacks | 1,546 | 4 | 1 | 0 | 5 |
| | Sockeye | 830 | 20 | 1 | 0 | 21 |
| | Steelhead | 475 | 0 | 0 | 0 | 0 |
| Aug. 27-Sept. 9 | Chinook | 1,332 | 30 | 3 | 7 | 40 |
| | Jacks | 1,711 | 2 | 0 | 0 | 2 |
| | Sockeye | 72 | 1 | 0 | 1 | 2 |
| | Steelhead | 481 | 0 | 0 | 0 | 0 |
| Sept. 10-23 | Chinook | 2,843 | 10 | 4 | 1 | 15 |
| | Jacks | 1,810 | 1 | 0 | 0 | 1 |
| | Sockeye | 29 | 1 | 0 | 0 | 1 |
| | Steelhead | 2,155 | 4 | 0 | 0 | 4 |
| Sept. 24-Oct. 7 | Chinook | 856 | 5 | 0 | 0 | 5 |
| | Jacks | 715 | 0 | 0 | 0 | 0 |
| | Sockeye | 7 | 0 | 0 | 0 | 0 |
| | Steelhead | 1,720 | 9 | 0 | 0 | 9 |
| Oct. 8-21 | Chinook | 273 | 3 | 0 | 0 | 3 |
| | Jacks | 156 | 0 | 0 | 0 | 0 |
| | Sockeye | 0 | 0 | 0 | 0 | 0 |
| | Steelhead | 1,119 | 4 | 0 | 0 | 4 |
| Oct. 22-27 | Chinook | 41 | 0 | 0 | 0 | 0 |
| | Jacks | 27 | 0 | 0 | 0 | 0 |
| | Sockeye | 0 | 0 | 0 | 0 | 0 |
| | Steelhead | 259 | 0 | 0 | 0 | 0 |
| Total | | 40,764 | 370 | 21 | 41 | 432 |